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The influence of a probe on the optical path of atomic absorption spectrometer with a graphite tube atomizer

Zakharov Y., Kokorina O., Okunev R.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

We have studied the influence on the atomic absorption signal of the obscuring of the transmission beam by a probe for the two-stage atomization in a graphite tube atomizer. The following parameters were varied: the thickness of the probe (0.5-1.0 mm), its displacement from the optical axis of the spectrometer (up to 2 mm), the diameter of the transmission beam (1.3-4.0 mm), the slit width of the monochromator, and the shape of the intensity distribution over the cross section of the beam emitted either by a hollow cathode lamp, or a deuterium lamp, or an electrodeless lamp. We have shown that, using a probe with a thickness that is optimal for the two-stage atomization (1 mm), it is possible to register analytical absorption signals from 28 chemical elements out of 56 (except Hg), which can be determined in graphite atomizers, with a maximal sensitivity and with no optical interference. The remaining elements can be determined with a lower sensitivity because of the necessity to lower the temperature of the secondary atomization.

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